AN EVALUATION OF KNOWLEDGE AND PERCEPTION AMONGST NURSING STUDENTS PERTAINING TO IBURPOFEN

Honors Thesis

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By

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Abstract

Ibuprofen is one of the most common over-the-counter pain medications accessible to consumers. It is known that ibuprofen can be dangerous to certain individuals (Curfman, 2015). This includes people who take this drug over prolonged periods of time, those who do not follow the necessary instructions/precautions, who may have heart disease or gastrointestinal complications, and others who may be at high risk for non-steroidal anti-inflammatory drug use. A 16-item questionnaire was developed to assess: a) how and when the decision is made to take pain medication, b) knowledge of recommendations and precautions related to the use of ibuprofen, c) how the decision is made to determine the amount of medication to take, and d) knowledge of potentially dangerous side effects.

The data of this survey showed that a majority of nursing students knew critical components to proper use of ibuprofen. It also demonstrated upperclassmen students to contain more knowledge regarding ibuprofen dosaging than underclassmen. Although there were important educational points that students knew pertaining to ibuprofen, there were also gaps in the necessary knowledge that the survey indicated.

With appropriate education and teaching of this common over-the-counter medication, it can decrease the risk for potentially dangerous complications in certain individuals. Due to this drug being so widely used and easily accessible, preventing improper use is essential for protecting our communities.

Keywords; [ibuprofen, over-the-counter, NSAID, nursing, pain relief, knowledge]

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Over-the-counter medications are medications that can be directly sold to the general population without a prescription from a provider. Individuals can buy these over-the-counter drugs without consulting a doctor or pharmacist about proper use or precautions. This can result in dangerous or life-threatening consequences. To prevent these consequences, it is important to consider how decisions are made in order to provide better drug education for the public.

Background

Pain is a discomfort that is felt by millions all over the world. Certain pains can range from mild to severe, depending on the cause. It can be the result of something acute such as a sore throat or sinus pain, to perhaps an individual feeling chronic pain from particular disorders. When a person is experiencing pain, they may reach for an over-the-counter pain reliever. There are several different kinds of over-the-counter pain relievers that one may take, including acetaminophen, ibuprofen, aspirin, and naproxen. Each pain medication has its own advantages and disadvantages. Some pain relievers might work better for certain pains than others. One of the most popular pain relievers, ibuprofen, is classified as a non-steroidal anti-inflammatory drug. "Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most common medications used to treat acute pain associated with a variety of conditions, such as headache, muscle injury, dental pain, sore throat and dysmenorrhea," (Mullan J, 2016).

Significance

Unlike prescriptions, over-the-counter medications can be taken without instruction from a healthcare provider. They do not contain prescription labels that provide step-by-step directions on how to take them. Over-the-counter drugs are easily accessible to consumers, resulting in an increased risk for improper use. Many individuals are not aware of side effects, how much drug to take, and specific precautions when choosing a medication. Individuals are also more likely to

initially self-medicate their pains, leading to an increased incidence of drug-related morbidity and gastrointestinal ulcers. It is necessary to know about patterns of ibuprofen use due to the potential for inappropriate and dangerous complications.

Literature Review

Ibuprofen usage has multiple benefits but there are also significant risks that can occur. Ibuprofen contains three different properties within the drug. It has an analgesic effect which decreases the amount of pain that someone may feel, it has an antipyretic effect which lowers a fever, and it has an anti-inflammatory effect which decreases the amount of inflammation in the body (A. Vallerand, 2020). This drug also has multiple adverse effects that can make the drug dangerous to patients who do not know the proper way to use this medication.

Those who take ibuprofen without food have an increased risk of developing a gastrointestinal ulcer. The action of NSAID's in the body is to decrease the production of prostaglandins. These prostaglandins protect the stomach lining from harmful stomach acids. When taking ibuprofen, it blocks that action and inhibits the production of those prostaglandins (Drini, 2017). It is important to assess an individual's gastrointestinal risk factors such as age, history of gastrointestinal diseases, and use of other medications before taking NSAIDs. Long term use of NSAID's when taking by those who are at high gastrointestinal risk may result in gastrointestinal ulcers and subsequently GI bleeding (Drini, 2017).

The FDA has alerted the public to watch for specific warnings pertaining to ibuprofen (U. S. Food and Drug Administration, 2016). Individuals who take dosages of ibuprofen that are higher than the recommended amount are also at an increased risk for heart attack and stroke. One of the most significant warnings is that "heart attack and stroke risk increase even with short-term use, and the risk may begin within a few weeks of starting the NSAID," (Curfman,

2015). The risk increases with higher doses and longer periods of use. People with the greatest risk are those who already have heart disease, however, people without heart disease may still be at risk (Curfman, 2015). It is recommended that individuals should take the lowest effective dose of ibuprofen possible, limit the length of time the drug is taken, and never take more than one type of NSAID at one time (Curfman, 2015).

Individuals who take ibuprofen may also not be taking the drug properly. Mechcatie conducted a survey on 1,326 adults. This survey tracked how much ibuprofen was taken daily and each person recorded it in their own diary. The data revealed a poor understanding of label cautions and recommendations. 11% of the ibuprofen users actually exceeded the daily limit at least once a day. These results "are important in providing, for the first time, diary-based estimates of how often and how NSAID dosing over the daily recommended limit occurs among users of ibuprofen, the most frequently taken drug in this class and one of the most commonly taken medications in the [United States]" (Mechcatie, 2018).

A study done through the Department of Medicine at University of Alabama assessed the frequency and indications of ibuprofen use and analyzed how aware the public was to the given side effects. 9,062 individuals participated in the study. Researchers found that 26% of their respondents used more than the recommended dose on the label. 15% of their respondents reported taking a daily use of ibuprofen and 49% were not concerned about potential side effects. They concluded that "OTC analgesics including NSAID's are widely used, are frequently taken inappropriately and potentially dangerously, and users are generally unaware of the potential for adverse side effects" (Wilcox C, 2005).

Hypothesis

The aim of this study is to identify knowledge of ibuprofen use in college aged students. It consists of a hypothesis that freshmen and sophomore year nursing students would be less aware of the proper ibuprofen use than the junior and senior year nursing students.

Methodology

An IRB application was made to the university's IRB committee in the fall of 2019. Approval was received on January 7, 2020. The 16-item questionnaire was put into a password protected SurveyMonkey account. The approved consent form was embedded in the questionnaire and participants had to agree to participate in order to complete the survey. Participants who did not agree to participate were taken to a separate screen where they were thanked for their time and the survey was exited. There was no identifiable information included in the survey.

A convenience sample of students enrolled in a 4-year undergraduate nursing program was used. First and second year students have limited clinical education and experience in the use of medications. Third- and fourth-year students have completed fundamental pharmacology education and have applied this knowledge in the clinical setting. Freshmen and sophomore nursing students were grouped into a category of underclassmen through SurveyMonkey. Junior and senior nursing students were grouped into a category of upperclassmen through SurveyMonkey.

The invitation to participate in the study was sent out to all nursing students via the student list serve. Students receiving the invitation were provided the hyperlink which took them to the questionnaire. Additionally, faculty read the identical invitation during class to encourage student participation.

Results

A total of 111 students responded to the invitation on SurveyMonkey. 109 of those students agreed to participate in the conducted survey, and 4 of those students selected no, they do not agree to participate. For those four students, the survey was ended and closed out. The second question of the survey asked the remaining 107 participants what their first choice of medication was for minor aches and pains.

75 respondents chose ibuprofen as their first-choice medication for minor aches and pains. 21 respondents selected acetaminophen, 8 respondents selected naproxen, 2 respondents selected aspirin, and 1 respondent chose other. The 32 respondents who did not select ibuprofen as their first-choice medication did not continue with the rest of the survey because this is an analyzation of specifically ibuprofen. Those 32 students were thanked for their participation and then asked to close out. Of those 75 respondents from question 1, only 69 students went on to complete the rest of the questionnaire, giving a sample size of 69.

The participants included 13 freshmen, 12 sophomores, 20 juniors, and 24 seniors. This resulted in 25 underclassmen and 44 upperclassmen. The given sample size of 69 included more junior and senior level nursing students than freshmen and sophomore level nursing students.

Grouping of Survey Questions

How and When the Decision is Made to Take Pain Medication (Questions 3, 5 and 8)

Question 3 asked if respondents consider the information on the label when deciding to use ibuprofen as their pain-relieving medication. 27 upperclassmen responded yes and 17 said no. This is compared to 12 underclassmen responding yes vs. 13 responding no. The chi-square result is x^2 (1, N=69) = .373328, $p>.05$ showing that this finding is not statistically significant.

Question 5 asked at what level of discomfort do most students take a dose of ibuprofen. Underclassmen students did not report taking ibuprofen for a pain level of 1-3. The chi-square testing result for mild and moderate levels of pain is x^2 (1, N=64) = 1.0037, $p>.05$. This indicates that the differences between upperclassmen and lower classmen is not significant for taking ibuprofen for moderate and severe pain. Testing was not performed for mild pain as zero underclassmen reported using it for this indicator and chi-square testing requires a sample of at least 5 in every cell.

Question 8 asked how often students use ibuprofen on a day-to-day basis. 8 underclassmen reported only using ibuprofen 1-3 times per week and 17 reported using it less than 5 times per month. 36 upperclassmen reported using ibuprofen 1-3 times per week and 5 used it less than 5 times per month. Of all respondents, 64% report using this medication 1-3 times per week however there is not a pattern when comparing underclassmen and upperclassmen. Usage of ibuprofen daily and/or more than three times per week was not reported by underclassmen.

Knowledge of Recommendations and Precautions Related to the Use of Ibuprofen (Questions 7, 9 and 10)

Question 7 asked how soon nursing students expect the drug to start working. 10 underclassmen expected it to work in 30 minutes or less compared to 20 upperclassmen. This is in comparison to 12 underclassmen and 31 upperclassmen expecting it to take longer than 30 minutes. The chi-square analysis of this indicator is x^2 (1, N=69) = .619099, $p>.05$. There is not a significant difference between these two groups of students.

Question 9 asks how long do respondents wait between dosages. There is not a difference in the amount of time between upperclassmen and underclassmen. The percentage of students

waiting 4-6 hours is the same for each group. There were 2 upperclassmen who stated they did not know, and one stated that they typically wait until the next day.

Question 10 asked students about their knowledge of special recommendations. Both upperclassmen and underclassmen reported the need to avoid taking this medication on an empty stomach, there is a risk of GI bleeding and people with underlying medical conditions may be at risk for complications. The distribution of these responses across both student groups is approximately equal.

How the Decision is Made to Determine the Amount of Medication to Take (Questions 4, 6 and 11)

Question 4 asked about the use of label information to determine how much medication to take. Chi-square testing results are x^2 (1, N=69) = .964005, $p>.05$. There is not a significant difference between these two cohorts of students.

Question 6 asked about whether students adjust the dosage of ibuprofen depending on the severity of the pain. Student from all cohorts answered. 27 stated that they adjust the dosages, and 42 responded that they do not. Chi-square testing results are x^2 (1, N=69) = .3903, $p>.05$. These findings are not statistically significant.

Question 11 asked respondents what their normal dosage of ibuprofen was. The dosage in all cohorts varied between 2 and 3 tablets yet both of these dosages are within dosaging guidelines.

Knowledge of Potentially Dangerous Side Effects (Questions 12, 13, 14 and 15)

Question 12 asked about knowledge of a daily dosage. Between the two cohorts of lower classmen and upper classmen students, this finding is statistically significant. The chi-square

statistic is x^2 (1, N=69) = 7.3709, $p < .05$. The upperclassmen students are more likely than lower classmen students to know the recommended daily dosage of ibuprofen.

Question 13 asked about the risk of heart attack when using ibuprofen. All students responded to this question. The findings are not statistically significant, x^2 (1, N=69) = .73927, $p>.05$. There is not a difference between upper classmen and lower classmen in their knowledge of the association between ibuprofen and heart attack.

Question 14 asked about the risk of stroke when using ibuprofen. Under classmen students were equal in their "yes" and "no" responses to this question. Upper classmen students showed 66% stated they knew of this risk and 33% did not. Chi-square testing shows that this is not statistically significant however, x2 (1, N = 69) = 0.98717, p>.05. There is not a difference in cohorts and their knowledge of ibuprofen causing an increased risk of stroke.

Question 15 asked about the risk of stomach ulcers when ibuprofen is used for pain relief. 19 underclassmen responded that they knew of this risk whereas 6 stated that they did not. For the upper classmen cohort, all stated that they knew of the risk of stomach ulcers. For this reason, chi-square testing could not be done as all cells must have a sample of at least 5.

Discussion

This study showed that more knowledge of appropriate dosaging of this medication was seen by upperclassmen nursing students than students who were underclassmen. The statistical significance of this finding supports the findings at the University of Alabama.

How and when decisions are made about ibuprofen medication can be based upon numerous extraneous factors that were not found to be significant. Prior to entering college, students may have taken whatever dosage was provided to them by a parent or caregiver. How

this knowledge of ibuprofen administration is determined is unknown, and warrants further study.

Knowledge of recommendations and precautions, as per this survey did not provide any statistically significant results. Testing of this was not conducted because the number of respondents did not meet the minimum required for chi-square testing. A larger sample size could provide the necessary study participants that can investigate this data further. A previous study shows that this study's question is significant and should be investigated more.

Dosaging and when to take this medication has not been clearly determined in this study. There was not a statistically significant finding between upper classmen and lower classmen when asked about this criterion. Upper classmen study pharmacology in their first semester at this level of education. It is important to ask at what semester these students are in clinical practice. Familiarity with medication administration is a cornerstone of nursing education in the final four semesters of a baccalaureate education.

Knowledge of potentially dangerous side effects is a serious concern as the public purchases over-the-counter medications. Knowledge of the proper amount of medication to take was found to be different between upper classmen and lower classmen. Failure to know how much medication to take is the foundation upon which the risk for other medication complications develop. This finding supports the need for further study of this potential risk to the general public.

Limitations

A limitation to this survey was the number of participants. With a greater sample size, there could have been a more significant trend in the data. This would have shown a better understanding of students' education regarding this drug. Another limitation to this study was the

uneven number of students in different years of study. If there were a more even number of freshmen, sophomores, juniors, and seniors, comparison in the data to see which grade level held the most knowledge and accurate perceptions would be significant. This would have been a way to study what students knew before their pharmacology course, and after. The need to sample students who are not in a nursing program would also provide data that would demonstrate what individuals know about ibuprofen. The possibility of nursing students working in a healthcare setting could also demonstrate an increase in medication knowledge.

Conclusion

The significant finding of knowledge about dosing supports the hypothesis that students without a formal education in the foundations of pharmacology are at a higher risk of complications from taking this medication. A consideration that was not included in this survey research is the need to study non-nursing students and ask them how they self-medicate minor aches and pains with ibuprofen.

Adverse drug effects are not uncommon for many doctors and nurses to experience in the hospital setting. Understanding the disease processes and safe medication administration is crucial for all health care professionals. Being able to recognize important symptoms in patients will help the underlying issue of these dangerous adverse effects and create better outcomes. Not only are there the adverse cardiovascular risks, but NSAID's can also create gastrointestinal complications. Using drugs like ibuprofen prevents the stomach's ability to protect itself against stomach acids. The appropriate knowledge with non-steroidal anti-inflammatory medications in our population will reduce the incidence of these adverse effects from occurring. This study can support the fact that not all over-the-counter drug users know the potential risks and

complications. Providing adequate knowledge and education on medications can diminish the amount of harmful effects from this drug.

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Appendix A

INTRODUCTION: This research will ask you questions about how you decide to take the medication ibuprofen for general aches and pains. The purpose of the study is to identify how undergraduate nursing students decide which medication to take and how it should be taken. The goal of this study is to inform health care professionals of how ibuprofen is used by undergraduate nursing students.

PARTICIPATION: Taking part in this survey is completely voluntary. You may stop your participation at any time. You are free to decline to answer any question you do not wish to answer. There are no right or wrong answers. All answers will remain completely anonymous.

RISKS: There are no foreseeable risks involved in participating in this study other than those minimal risks encountered in day-to-day life.

BENEFITS: The benefits of your participation in this survey are your contribution to the health care field to understand how ibuprofen is used by undergraduate nursing students. The benefits of this study ingeneralareadvancingtheknowledgeofhowhealthcareprofessionalscanhelpundergraduatestudents during their course of study to safely treat minor aches and pains.

ANONYMITY/CONFIDENTIALITY: Your name or identity will not be used in reports or presentations of the findings of this research. Information provided to the researchers will be kept anonymous. This research project has been approved by the Institutional Review Board at Salem State University. Thank you for your help.

An analysis of the results and an explanation of the study will be available in the Salem State University's Digital Commons which can be accessed at https://digitalcommons.salemstate.edu/honors_theses/

CONTACT: For questions or concerns about the research, please contact Dr. Nancy W. Ebersole at nebersole@salemstate.edu.

For concerns about your treatment as a research participant, please contact: Institutional Review Board (IRB)
Salem State University 352 Lafayette Street
Salem, MA 01970
(978) 542-7177 orirb@salemstate.edu

1. I agree to participate in the following survey
   a. Yes
   b. No

2. What is your first choice of medication for minor aches and pains, such as a headache?
   a. Ibuprofen (Advil or Motrin)
   b. Acetaminophen (Tylenol)
   c. Naproxen (Aleve)
   d. Aspirin (Bayer)
   e. Other

   If you chose Ibuprofen (Advil or Motrin) for question one, please continue the survey. If not, this is the end of your survey. You may close out. Thank you for participating.

3. Do you consider the information on the label when you make the decision to use ibuprofen?
   a. Yes
   b. No
4. Do you use the label information when deciding how many tablets to take?
   a. Yes
   b. No
5. On a pain scale of 1-10 (1 being the least amount of pain you feel and 10 being the greatest amount of pain you feel), at what number do you decide to take ibuprofen?
   a. Mild 1-3
   b. Moderate 4-6
   c. Severe 7-10
6. Do you use the same dose depending on the severity of your pain (mild, moderate, severe)?
   a. Yes, I use the same dose for all severities of pain
   b. No, I adjust my dose depending on the severity of pain
7. When taking ibuprofen, how soon do you expect it to begin working?
   (Fill in the blank)
8. How often do you take ibuprofen?
   a. Daily
   b. 1-3 times a week
   c. More than 3 times a week
   d. Less than 5 times a month
9. After how many hours can you take another dose?
   (Fill in the blank)
10. Do you know of any special recommendations/precautions that should be followed when taking ibuprofen?
    (Fill in the blank)
11. Ibuprofen typically comes in 200 mg tablets. How many tablets do you usually take when you take a dose of ibuprofen?
    a. 1 tablet (200 mg)

b. 2 tablets (400 mg)
c. 3 tablets (600 mg)
d. 4 tablets (800 mg)

12. Do you know the recommended daily dosage for ibuprofen?
    a. Yes
    b. No
13. Are you aware that excessive use of ibuprofen increases your risk of heart attack?
    a. Yes
    b. No
14. Do you think that ibuprofen use increases your risk for stroke?
    a. Yes
    b. No
15. Do you think that ibuprofen use increases your risk for stomach ulcers?
    a. Yes
    b. No
16. What year of study are you in?
    a. First year
    b. Second year
    c. Third year
    d. Fourth year